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GUIDE FOR
AQUARIUMS
AND
YACHTS

THE
WORLDS
GREATEST
MUSIC

GUIDE FOR
MOTOR BOATS
AND YACHTS



Compliments of

INSURANCE COMPANY OF
NORTH AMERICA
PHILADELPHIA, PA.

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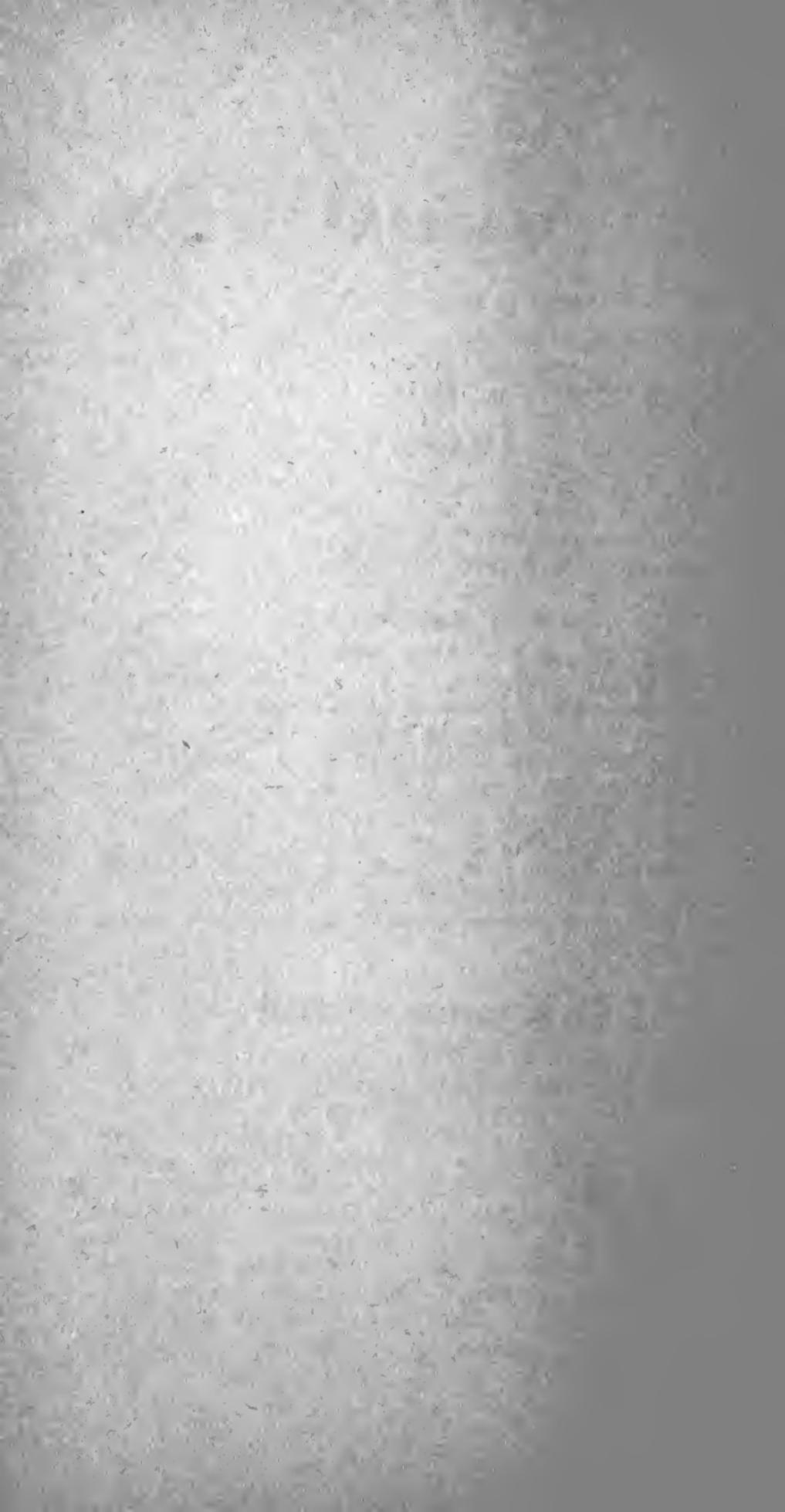


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GASOLINE

SPECIFIC GRAVITY

Commercial gasoline has a specific gravity of from 0.7 to 0.74. It does not mix with water but floats on it, and spreads indefinitely over the surface.

VAPOR

Gasoline evaporates rapidly when warm, but very slowly in freezing weather. The vapor (not the liquid) is highly inflammable, and may be ignited by an electric spark, a flame, or red-hot metal.

WHEN EXPLOSIVE

Mixtures of gasoline vapor and air in the right proportions are explosive. Pure gasoline vapor, on the contrary, will burn only as it finds air. It is the heavy, rapidly-forming vapor, spreading from bow to stern of the boat, that makes gasoline in the bilge so dangerous. The smallest accidental spark, a back-fire, or a lighted match will explode the mixed vapor and air, and set the bilge afire.

A gasoline fire cannot be extinguished by playing water on it, but only by the use of chemical extinguishers, several of which should be handy in every motor boat.

THE CARBURETOR

Principle—The carburetor is a device for vaporizing liquid gasoline and mingling the vapor with air in explosive proportions. It operates usually on the principle of an atomizer. A stream of air is drawn by the piston suction past a minute nozzle, from which a spray of gasoline is sucked and evaporated by the rush of air. To maintain a uniform supply of gasoline, a float chamber is interposed between the tank and the spray nozzle. Gasoline enters the float chamber by gravity, and a float valve opens and closes to admit or shut off the supply of gasoline, thereby maintaining a constant level in the float chamber.

HEAT REQUIRED

Gasoline, like all other liquids, absorbs heat on evaporation. If the air is warm enough to evaporate the gasoline, no added heat is required, otherwise the air must be heated, or heat must be applied to the intake pipe between the carburetor and the engine. This heat is usually supplied by a portion of the exhaust gases, which is passed through a jacket surrounding the intake pipe.

STARTING

When an engine is started cold, an excess of gasoline is supplied to the carburetor in order that enough may evaporate. This is done by depressing the float to flood the "mixing chamber," or by strangling the air intake, thereby sucking an abnormal quantity of gasoline from the spray nozzle.

COLD WEATHER

In cold weather heat is required to evaporate sufficient gasoline for starting. This is supplied by pouring hot water over the carburetor. Another and simpler expedient is to have on hand a squirt can of sulphuric ether, which is volatile at low temperatures and very inflammable. This ether is squirted into the intake pipe, or into the cylinders themselves, if the latter are provided with relief cocks.

SHUT-OFF VALVE

As carburetor float valves sometimes leak, a shut-off valve close to the tank is essential. This valve should be so placed that by closing it and disconnecting two or more unions, the gasoline pipe can be taken out bodily in order to clear out stoppages or to repair leaks.

THE GASOLINE PIPING

Sweated Pipe Joints—All joints (not unions) in the gasoline piping should be sweated solidly together. Mere screw-joints cannot be trusted.

PROTECT THE GASOLINE PIPE

The gasoline pipe should be fully protected against shifting ballast and careless feet. It may be run either under the floor or along the inner side of the hull, but should be covered throughout its length by a grooved strip of wood or the like. Next to the

engine it should have a coil to allow for vibration. On no account should the pipe be left without support at frequent intervals, as this will cause sagging and straining at the ends.

THE TANK

Installation—The gasoline tank should rest in a drip pan drained outboard above the water line, and this pan should be separated by a water-tight bulkhead from the rest of the boat, so that a leak cannot endanger the latter. The gasoline pipe should be carried through a stuffing box in the bottom or side of the drip pan. Tank and drip pan should be rigidly secured together, to avoid straining the pipe connection at the stuffing box.

STRAINER

It is very desirable to have a double wire gauze screen inside the filling opening, so that, if gasoline poured from a can should catch fire, the flame will not strike through the gauze to the tank. The same gauze will act as a strainer also.

HINTS ON IGNITION APPARATUS

The ignition system may be of the make and break or the jump spark type. The former requires only a battery or low tension magneto, a gas lighting coil, and igniters by means of which sparks are produced in the cylinders by making and breaking electric contact at the proper moment inside the cylinders.

MAKE AND BREAK SYSTEM

The make and break system requires no great care in insulation. The igniters, however, wear rapidly, and their contact points are burned by the sparks. Steel contacts last only a short time and must be frequently filed clean.

Occasionally the installation of the fixed sparking point becomes coated with soot from half burned gasoline and oil, and must be cleaned with gasoline and a tooth brush or fine sandpaper. If mica is used, the soot in time collects between the mica leaves and a new insulator is required. Mis-firing in this ignition system may be due to soot on the insulation, to badly burned contact points, or to weak batteries.

JUMP SPARK SYSTEM

In the jump spark ignition system the low tension current is not delivered directly at the sparking points. Instead, it is carried through an induction coil, in which is induced a current of tension high enough to jump a fixed air gap of one-quarter inch or more. This high tension current is led by heavily insulated cables to spark plugs screwed into the cylinders and having fixed sparking gaps at their inner ends of about one-fiftieth of an inch. The reason for the small gap is that the electrical resistance of air is increased considerably by compression.

SPARK PLUGS

Porcelain is the usual insulating material of spark plugs. It is fragile, therefore extra porcelains should be carried, together with asbestos gaskets for same, and complete spare plugs. The easiest way to determine whether or not a plug is defective is to take it out and screw in another.

The jump spark ignition system depends for success on scrupulous insulation of the high tension circuit. A little water, or even moisture, on the spark plugs or the terminals of the cables, or on the distributor, if there be one, will cause leakage of the high tension current.

ADJUSTING THE VIBRATORS

Where batteries are used with the ordinary type of coils, the vibrators, or tremblers, as they are sometimes called, require careful attention to see that the contact points are kept clean and are properly adjusted. They should be adjusted to make as light a contact as will produce steady vibration. Occasionally the platinum contact points should be dressed down with a very fine jeweler's file.

There is now to be had a type of battery apparatus producing a single spark per explosion with great economy of current. It employs no trembler and is free from the necessity for delicate adjustment of that member.

HELPS FOR STARTING A MOTOR

One of the first things to know is the condition of the spark; test the batteries if you have a meter and if there are any dead cells throw them out. See that the connectors do not touch each other, then try your spark; if you have a one-quarter

inch good jump, or if it is make and break, snap the wire on the engine frame, and if the spark shows hot and lively, look further for your trouble.

Take out the spark plugs, see that they are clean; set the points a little less than the thickness of a dime apart; see if the spark jumps across the points when the plug is laid on the cylinder, then insert a piece of mica or a good thick card between the points, and if the spark goes around it, the plug is all right, but if it disappears, the plug is leaking somewhere and it is worthless.

If it is make and break, the ignition points may be corroded; frequently there is a plug in the side of the cylinder which, when it is taken out allows one to see the spark in action, but beware of this hole, for if there is any gas in the cylinder, the resulting explosion is liable to send out a stream of fire into the investigator's face. Other makes have removable igniters, and on some it is necessary to remove the cylinder head to see the spark.

The moving parts must all move freely with no catching or binding, as their successful action depends upon their breaking the circuit instantaneously; if there is any hang or slow action, the resulting spark will be weak and poor.

GENERAL INFORMATION

When using acetylene lamps in a fog it will be found best to tie a white handkerchief over the front of the lamp, both for seeing and to be seen.

If a nut is from any cause so fixed that it becomes difficult to get it off, a little gasoline or kerosene squirted over it will sometimes help it. Failing in this, heat must be applied.

Attention cannot too often be called to novices in motor matters to be extremely careful that the ignition lever is retarded before they attempt to start the motor. Otherwise the nasty blow from a backfire may be experienced.

Black smoke issuing from the muffler pipe may be taken as an indication that much too rich a mixture is being fed to the motor. Blue smoke indicates a surplus of lubricating oil. White smoke usually occurs only when overflow water is passed through the muffler to any appreciable amount, forming a steam.

When your motor suddenly stops, if you find no electrical trouble and when you attempt to start a "kick" occurs with the spark lever properly retarded,

it is probable that there is some trouble with the commutator or timing gear. The connection of the timer shaft to its driving member may have slipped or broken, causing the contact to occur at an improper time.

USEFUL HINTS

Couplings—When a motor is new, watch the couplings of the exhaust pipe very carefully. They are apt to work loose at first owing to the expansion of the exhaust pipe when hot and its subsequent cooling. Occasionally tighten the couplings with a wrench and this will soon set them, after which they should require no further attention.

Insulation of Wire Terminals—A good varnish is had by dissolving some ordinary red sealing wax in gasoline, adding a few drops of linseed oil. Shake well, with the cork out, the bottle containing this mixture. When you find the varnish reduced itself to a working consistency, replace the cork.

Filling Gasoline Tanks—In replenishing gasoline, do so with a funnel, fitted with fine gauze. As an additional precaution it is wise to place a piece of chamois over the top of the funnel, as this not only prevents impurities passing, but will also stop any water which may be present in the gasoline.

How to Remove Grease Spots before Painting—Wash over smoky or greasy parts with saltpetre or very thin lime whitewash. If soapsuds are used, they must be washed off thoroughly, as they prevent the paint from drying hard.

To Remove Rust from Steel—Rub the steel with sweet oil; in a day or two rub with finely powdered unslackened lime until the rust all disappears; then oil again, roll in a woolen cloth and put in a dry place, especially if it be table cutlery.

Bronze may be Renovated and recolored by mixing one part of muriatic acid and two parts of water; free the article from all grease and dirt and apply the diluted acid with a cloth; when dry, polish with sweet oil.

For Waterproofing Canvas—In covering boats for the winter, or in making canvas covers for engines of open boats, it is usually desirable to treat the canvas in some way to make it waterproof. There are a number of ways to do this. Some owners paint the canvas, others treat it with a coating of boiled linseed oil, and there are numerous other compositions that give more or less satisfaction. The following formula should make an absolutely water-

proof coating: Get a small ten cent bottle of rubber cement, such as is used for patching rubber boots, etc., and dissolve it in a pint jar filled nearly full of gasoline, shaking the bottle well until dissolved. Apply this on one side of the canvas with a paint brush, brushing in evenly, and let it dry thoroughly in the sun. This will leave the duck soft and pliable, doing away with the stiffness inseparable from paint or linseed oil; and while it may discolor slightly with the weather, it makes a good waterproof coating.

FIRE PRECAUTIONS

One of the greatest dangers of a motor boat is fire, and you cannot be too careful in trying to prevent such a calamity.

Get in the habit of using nothing but safety matches.

Often a boat has been burned to the water's edge by throwing a lighted match into the bilge.

Keep your bilge as dry as possible, and don't try to see whether it is gasoline or water in it by striking a match. In employing this method you may never find out, but your friends will.

Always clean up your boat before leaving it, and be sure there is no waste lying around the boat.

Fires have often been started by the sun's rays being focused through a cabin window or from a piece of tin on to some oily waste or rags.

Spontaneous combustion often arises from oily waste or rags. It is cheaper to throw them away after using than to have a fire.

There are no specific means of promptly and effectually extinguishing burning gasoline. Besides the usual fire extinguishers, suitable chemical, or bags of coarse flour or sand will serve the purpose.

DON'TS

Don't expect your engine to run without oil.

Don't use a dirty stick to measure the depth of gasoline in tank.

Don't set sail without measuring the fuel on hand, noting your stocks of oil and grease, and satisfying yourself that the battery will get you home.

Don't forget to strain the gasoline; the engine won't run on water or dirt.

Don't hunt for a gasoline leak with matches. Have an electric flashlight; the kind with long flexible cord, that attaches to battery, is best.

Don't forget to include a battery tester, set of spark plugs, and several yards of spare insulated wire in your equipment.

Don't forget to shut off the gasoline at the end of every run. You never know when the carburetor float valve may start leaking.

Don't neglect a carburetor leak; it's more dangerous aboard a boat than gunpowder.

Don't conclude that the carburetor adjustment is wrong if the engine does not start on the first turn. You may have forgotten to close the switch or open the shut-off valve at the tank.

Don't use the same measures or funnels for gasoline that you have been using for lubricating oil, kerosene or water.

Don't fill acetylene gas lamps with carbide until they are to be used, as carbide is very susceptible to moisture and slacks rapidly on exposure to air.

Don't monkey with the carburetor adjustments ever before the engine starts. If the engine has run once with a certain adjustment and fuel it will do so again. Hunt for the trouble elsewhere. If a cold day, try hot water on the carburetor. If a hot day, try less priming—you may have a mixture too rich to ignite.

Don't forget that the way to adjust a carburetor is to get the engine started first, and then change only one adjustment at a time, very slightly, and note its effect on the engine.

Don't festoon the ignition wiring all over the battery engine, and all that lies between. Prove your intelligence by making a ship-shape job. Good insulation, snug connections, coils where flexibility is needed, and proper support, all play a part.

Don't wait until you have used your last fresh spark plug before cleaning the sooted ones.

Don't wait until the pump chokes up before you learn how to take out and clean the valves.

Don't try to pump bilge water through the circulating pump.

SOUND SIGNALS

- Short Blast: One second.
- Long Blast: Three seconds.
- : I am directing my course to starboard.
- — : I am directing my course to port.
- — — : My engines are going full astern.
- — — — : You are standing into danger.
- — — — — : I want assistance; remain by me.
- — — — — — : Your lights are out or want trimming.

SIGNAL SYSTEM TO ENGINEER

1. When engine is stopped, one bell means ahead slow.
2. When running ahead slow, jingle means full speed ahead.
3. When running full speed ahead, one bell means slow down.
4. When running ahead slow, one bell means stop.
5. When stopped, two bells mean astern slow.
6. When running astern slow, jingle means full speed astern.
7. When running astern slow or at full speed, one bell means stop.
8. When running full speed ahead, four bells mean astern.
9. With jingle, full speed astern.

When no jingle bell is provided the following signals will suffice:

1. When stopped, one bell means ahead.
2. When running ahead, one bell means stop.
3. When stopped, two bells mean astern.
4. When running astern, one bell means stop.
5. When running ahead, four bells mean astern.

DISTRESS SIGNALS

Skyrockets and Coston Signals should be carried for emergency use in case of accident or distress. At least a dozen good skyrockets should be carried aboard. These should be wrapped in oiled silk and kept in a waterproof case. Coston Signals burn different colored lights in succession. An unlimited combination of colors can be effected and distinguish-

ing signals produced. The use of these signals is regulated by the government and individual ships and companies are allotted their private signal. A book containing a list of these signals should be kept aboard. Every yacht club applying for the same is allotted by the government a distinguishing Coston signal. These are not necessarily used for distress signals, but are often used for reporting position or arrival at night. Several of these signals should be carried aboard and kept dry with the skyrockets.

NIGHT SIGNALING BY MORSE CODE

The attention of Masters and Pilots of vessels is drawn to the great facilities afforded for communicating at night time with Signal Stations by Morse Lamp; but there are certain points which should be carefully borne in mind when signaling, so that signals may be clearly read at the Reporting Station.

1. All other lights in the vicinity of the Flashing Lamp should be obscured.

2. The Flashing Lamp should be kept continually pointed directly towards the Station.

3. Care should be taken that proper regularity is observed in the lengths of flashes and spaces, and that the spaces between the words are considerably longer than those between the letters.

4. Vessels should, if possible, avoid coming within the rays of a Light-house while signaling.

5. When "Morsing" a vessel's name, it is desirable that the name should be spelled in full.

6. If you have not a flash light aboard, the same effect can be procured by moving a piece of cardboard up and down in front of an ordinary lamp, or using a whistle.

The Morse Code of signals and signal characters universally adopted is as follows:

— Indicates a Long flash of about 3 seconds' duration.

— Indicates a Short flash of about 1 second duration.

Preparative signal to attract attention, — — — — —, etc.

Answering signal, or I understand, — — — — —, etc.

Interval between each flash or sound.....1 second

Interval between each letter.....3 seconds

Interval between each word or group6 seconds

The Letters are Indicated as Follows:

A	— — —	N	— — —
B	— — — —	O	— — — —
C	— — — — —	P	— — — — —
D	— — — — —	Q	— — — — — —
E	—	R	— — —
F	— — — —	S	— — —
G	— — — —	T	—
H	— — — —	U	— — —
I	— — —	V	— — —
J	— — — — —	W	— — —
K	— — — —	X	— — — —
L	— — — —	Y	— — — — —
M	— — —	Z	— — — — —

BOXING THE COMPASS

Every yacht, no matter how small or how confined the waters in which she sails, should have a mariner's compass on board. The compass should be placed as far as possible from the motor or any iron work on the boat. Inside the bowl of the compass will be found a vertical line called the "lubber line." This, with the centre of the card, indicates the boat's longitudinal centre line. The "lubber line" should be toward the bow, then the points on the compass card will indicate the direction the boat is pointing.

The names of the "points" reading in the direction the hands of a watch move are as follows: NORTH, North by East, North-Northeast, Northeast by North, Northeast, Northeast by East, East-Northeast, East by North. EAST, East by South, East-Southeast, Southeast by East, Southeast, Southeast by South, South-Southeast, South by East, SOUTH, South by West, South-Southwest, Southwest by South, Southwest, Southwest by West, West-Southwest, West by South. WEST, West by North, West-Northwest, Northwest by West, Northwest, Northwest by North, North-Northwest, North by West, North. The above is called "Boxing the Compass."

THE WATCH AS A COMPASS

The points of the compass may be determined with the aid of an ordinary watch. It is simply necessary to bring the watch in a position so that the hour hand is directed toward the sun. The south then lies exactly midway between whatever hour it may happen to be and the numeral XII on the dial.

Let us suppose, for instance, that it is four o'clock, and that the timepiece is held in the position indicated. The direction of the numeral II will then be the exact south. If it be eight o'clock, the numeral X will indicate the exact southerly point.

WIND-BAROMETER INDICATIONS

When the wind sets in from points between south and southeast and the barometer falls steadily a storm is approaching from the west or northwest, and its centre will pass near or north of the observer within 12 to 24 hours with wind shifting to northwest by way of southwest and west. When the wind sets in from points between east and northeast and the barometer falls steadily a storm is approaching from the south or southwest, and its centre will pass near or to the south or east of the observer within 12 to 24 hours with wind shifting to northwest by way of north. The rapidity of the storm's approach and its intensity will be indicated by the rate and the amount of the fall in the barometer.

ABOUT BUOYS

The following system of buoyage as adopted by the United States in waters under Government survey, should be familiar to every owner of a motor boat. Too much reliance should not be placed upon the light draught of motor boats. Sometimes the obstructions at low water are awash, or nearly so, and the difference between going upon the right side of a buoy or upon the wrong side may mean the safety or loss of your boat.

Red Buoys—In approaching a channel from seaward, red buoys, with even numbers, will be found on the starboard side of the channel, and must be left on the starboard hand in passing in.

Black Buoys—Black buoys, with odd numbers, will be found on the port side of the channel, and must be left on the port hand in passing in.

Red and Black Horizontal Striped Buoys—Buoys painted with red and black horizontal stripes will be found on obstructions, with channel-ways on either side of them, and may be left on either hand in passing in.

White and Black Perpendicular Striped Buoys—Buoys painted with white and black perpendicular stripes will be found in mid-channel and must be passed close-to to avoid danger.

All other distinguishing marks to buoys will be in addition to the foregoing, and may be employed to mark particular spots.

Perches, with Balls, Cages, etc.—Perches, with balls, cages, etc., will, when placed on buoys, be at turning points, the color and number indicating on what side they shall be passed.

Different channels in the same bay, sound, river or harbor, will be marked, as far as practicable, by different descriptions of buoys. Principal channels will be marked by nun buoys; secondary channels by can buoys, and minor channels by spar buoys. When there is but one channel, nun buoys, properly colored and numbered, are usually placed on the starboard side, and can buoys on the port side of it.

Day beacons, stakes, and spindles (except such as are on the sides of channels, which will be colored like buoys) are constructed and distinguished with special reference to each locality, and particularly in regard to the background upon which they are projected. Motor boat men should study this code.

DUTY TO STAY BY AFTER COLLISION

An Act in Regard to Collision at Sea.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That in every case of collision between two vessels it shall be the duty of the master or person in charge of each vessel, if and so far as he can do so without serious danger to his own vessel, crew and passengers (if any), to stay by the other vessel until he has ascertained that she has no need of further assistance, and to render to the other vessel, her master, crew and passengers (if any) such assistance as may be practicable and as may be necessary in order to save them from any danger caused by the collision, and also to give the master or person in charge of the other vessel the name of his own vessel and her port of registry, or the port or place to which she belongs, and also the name of the ports and places from which and to which she is bound. If he fails so to do, and no reasonable cause for such failure is shown, the collision shall, in the absence of proof to the contrary, be deemed to have been caused by his wrongful act, neglect, or default.

Sec. 2. That every master or person in charge of a United States vessel who fails, without reasonable

cause, to render such assistance or give such information as aforesaid shall be deemed guilty of a misdemeanor, and shall be liable to a penalty of one thousand dollars, or imprisonment for a term not exceeding two years; and for the above sum the vessel shall be liable and may be seized and proceeded against by process in any District Court of the United States by any person; one-half such sum to be payable to the informer and the other half to the United States.

Sec. 3. That this act shall take effect at a time to be fixed by the President by Proclamation issued for the purpose.

Approved September 4, 1890. To take effect on December 15, 1890.

WHEN THE BOAT OVERTURNS.

Don't go out in a pleasure boat without being assured that there are life-saving buoys or cushions aboard sufficient to float all on board in case of an upset or collision. All persons should be seated before leaving shore, and no one should attempt to exchange seats in mid-stream or to put a foot on the edge or gunwale of the boat to exchange seats. Where the waters become rough from a sudden squall or passing steamers, never rise in the boat, but settle down as close to the bottom as possible, and keep cool until the rocking danger is passed. If overturned, a woman's skirts, if held out by her extended arms, while she uses her feet as if climbing stairs, will often hold her up while a boat may pull out from the shore and save her. A non-swimmer, by drawing his arms up to his side and pushing down with widely-extended hands, while treading water with his feet, may hold himself up several minutes, often when a single minute means a life; or throwing out the arms, dog fashion, forward, overhand and pulling in, as if reaching for something—that may bring him in reach of help.

RULES FOR REVIVING PERSONS RESCUED FROM THE WATER

1. Loosen the clothing; place the face downward, with the forehead resting on one of the wrists, and the face turned to one side. Open the mouth; seize the tongue between the fingers, covered with a piece of cloth, and draw it forward between the teeth; clear the mouth and throat from mucus by passing the forefinger, covered with a handkerchief or

piece of cloth, far back into the mouth, thus opening a free passage to the windpipe.

2. Turn the body face upward, shoulders resting on a folded coat or pillow; keep the tongue drawn forward; raise the arms backward and upward to the sides of the head (this expands the chest and allows the air to enter the lungs), then slowly move them downward, bending them so that the elbows will come to the sides and the hands across on the pit of the stomach, and press them gently but strongly against the sides and chest (this forces the air out of the lungs). Continue these two movements (which produce artificial breathing) very deliberately about ten or twelve times in a minute, and without ceasing, until the patient breathes naturally, or until satisfied that life is extinct.

3. While this is being done a little friction on the chest may be produced by rubbing gently with a warm flannel, and the body may be stripped and wrapped in dry blankets. After natural breathing begins, continue very gently, for a few minutes, the two movements which produced artificial breathing. After natural breathing is fully restored, give the patient a teaspoonful of brandy, hot sling or tea, two or three times a minute until the beating of the pulse can be felt at the wrist.

Rub the arms and legs upward, and the feet and hands with a warm or dry flannel.

Apply hot cloths to the body, legs and arms, and bottles of hot water to the feet.

Do not be discouraged if animation does not return in a few minutes. The patient sometimes recovers after hours of labor.

Do not allow the tongue to fall back and close the windpipe while the arms are being worked.

Do not rub the legs and arms until natural breathing is restored.

Do not put any liquid in the mouth until natural breathing is fully restored.

Do not roll the body or handle it roughly.

Do not allow the head to hang down.

NAUTICAL TERMS

The bow is the extreme forward part of the ship. The stern is the after part. Foreward is the fore part of the vessel. Aft is the rear part. Amidships is the central part of the vessel. Starboard is the right side of a ship, looking forward. Port is the left side.

KNOTS AND MILES

The statute mile is 5280 feet.

The British Admiralty knot or nautical mile is 6080 feet.

The statute knot is 6082.66 feet, and is generally considered the standard. The method of computing the number of feet in a statute knot is as follows:

The circumference of the earth is divided into 360 degrees, each degree containing 60 knots or (360×60) . 21,600 knots to the circumference, 21,600 divided into 131,385,546—the number of feet in the earth's circumference—gives 6082.66 feet—the length of a statute knot.

Knots	Miles
1	1,151
2	2,303
3	3,454
4	4,606
5	5,757
10	11,515
20	23,030
25	28,787

TABLE OF DISTANCES

Nautical Miles

	Hampton Roads	Cape May	New York	Newport	Boston	Portsmouth	Portland	Eastport
Eastport	666	517	458	326	242	207	174	0
Portland	591	426	362	214	111	53	0	
Portsmouth	575	407	320	194	62	0		
Boston	548	380	293	146	0			
Newport	371	231	136	0				
New York	279	138	0					
Cape May	154	0						
Hampton Roads	0							

AVERAGE RISE AND FALL OF TIDE

Places	Feet	Inches
New York, N. Y.	4	4
Old Pt. Comfort, Va.	2	5
Philadelphia, Penna.	5	3
Portland, Me.	8	9
San Diego, Cal.	3	7
Sandy Hook, N. J.	4	7
San Francisco, Cal.	4	9
Savannah, Ga.	6	8
Seattle, Wash.	12	2
Tampa, Fla.	2	2
Baltimore, Md.	1	2
Boston, Mass.	9	0
Charleston, S. C.	5	1
Eastport, Me.	18	2
Galveston, Texas	1	1
Mobile, Ala.	1	2
Key West, Fla.	1	2
New London, Conn.	2	5
New Orleans, La.	None	None
Newport, R. I.	3	5
Washington, D. C.	2	9

Highest tide at Eastport, Me., 218 inches. Lowest tide at Galveston, Texas, 13 inches.

LAWS AND REGULATIONS

Laws for Preventing Collisions and to Regulate Equipment of Motor Boats

An Act to Amend Laws for Preventing Collisions of Vessels and to Regulate Equipment of Certain Motor Boats on the Navigable Waters of the United States, dated June 11, 1910.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the words "motor boat" where used in this Act shall include every vessel propelled by machinery and not more than sixty-five feet in length except tug boats and tow boats propelled by steam. The length shall be measured from end to end over the deck, excluding sheer: Provided, That the engine, boiler, or other operating machinery shall be subject to inspection by the local inspectors of steam vessels, and to their approval of the design thereof, on all said motor boats, which are more than forty feet in length, and which are propelled by machinery driven by steam.

Sec. 2. That motor boats subject to the provisions of this Act shall be divided into classes as follows:

Class one. Less than twenty-six feet in length.

Class two. Twenty-six feet or over and less than forty feet in length.

Class three. Forty feet or over and not more than sixty-five feet in length.

Sec. 3. That every motor boat in all weathers from sunset to sunrise shall carry the following lights, and during such time no other lights which may be mistaken for those prescribed shall be exhibited.

(a) Every motor boat of class one shall carry the following lights:

First: A white light aft to show all around the horizon.

Second: A combined lantern in the fore part of the vessel and lower than the white light aft showing green to starboard and red to port, so fixed as to throw the light from right ahead to two points abaft the beam on their respective sides.

(b) Every motor boat of classes two and three shall carry the following lights:

First: A bright white light in the fore part of the vessel as near the stem as practicable, so constructed as to show an unbroken light over an arc of the horizon of twenty points of the compass, so fixed as to throw the light ten points on each side of the vessel, namely from right ahead to two points abaft the beam on either side. The glass or lens shall be of not less than the following dimensions:

Class two: Nineteen square inches.

Class three: Thirty-one square inches.

Second: A white light aft to show all around the horizon.

Third: On the starboard side a green light so constructed as to show an unbroken light over an arc of the horizon of ten points of the compass, so fixed as to throw the light from right ahead to two points abaft the beam on the starboard side. On the port side a red light so constructed as to show an unbroken light over an arc of the horizon of ten points of the compass, so fixed as to throw the light from right ahead to two points abaft the beam on the port side. The glasses or lenses in the said side lights shall be of not less than the following dimensions on motor boats of

Class two. Sixteen square inches.

Class three. Twenty-five square inches.

On and after July first, nineteen hundred and eleven, all glasses or lenses prescribed by paragraph

(b) of section three shall be fresnel or fluted. The said lights shall be fitted with inboard screens of sufficient height and so set as to prevent these lights from being seen across the bow and shall be of not less than the following dimensions on motor boats of

Class two. Eighteen inches long.

Class three. Twenty-four inches long.

Provided, That motor boats as defined in this Act, when propelled by sail and machinery or under sail alone, shall carry the colored lights suitably screened but not the white lights prescribed by this section.

Sec. 4. (a) Every motor boat under the provisions of this Act shall be provided with a whistle or other sound-producing mechanical appliance capable of producing a blast of two seconds or more in duration, and in the case of such boats so provided, a blast of at least two seconds shall be deemed a prolonged blast within the meaning of the law.

(b) Every motor boat of class two or three shall carry an efficient fog horn.

(c) Every motor boat of class two or three shall be provided with an efficient bell, which shall be not less than eight inches across the mouth on board of vessels of class three.

Sec. 5. That every motor boat subject to any of the provisions of this Act, and also all vessels propelled by machinery other than by steam, more than sixty-five feet in length, shall carry either life-preservers, or life belts, or buoyant cushions, or ring buoys or other device, to be prescribed by the Secretary of Commerce and Labor, sufficient to sustain afloat every person on board and so placed as to be readily accessible. All motor boats carrying passengers for hire shall carry one life-preserved of the sort prescribed by the regulations of the board of supervising inspectors for every passenger carried, and no such boat while so carrying passengers for hire shall be operated or navigated except in charge of a person duly licensed for such service by the local board of inspectors. No examination shall be required as the condition of obtaining such a license, and any such license shall be revoked or suspended by the local board of inspectors for misconduct, gross negligence, recklessness in navigation, intemperance, or violation of law on the part of the holder, and if revoked, the person holding such license shall be incapable of obtaining another such license for

one year from the date of revocation: Provided, That motor boats shall not be required to carry licensed officers except as required in this Act.

Sec. 6. That every motor boat and also every vessel propelled by machinery other than by steam, more than sixty-five feet in length, shall carry ready for immediate use the means of promptly and effectually extinguishing burning gasoline.

Sec. 7. That a fine not exceeding one hundred dollars may be imposed for any violation of this Act. The motor boat shall be liable for the said penalty and may be seized and proceeded against, by way of libel, in the district court of the United States for any district within which such vessel may be found.

Sec. 8. That the Secretary of Commerce and Labor shall make such regulations as may be necessary to secure the proper execution of this Act by collectors of customs and other officers of the Government. And the Secretary of the Department of Commerce and Labor, may upon application therefor, remit or mitigate any fine, penalty or forfeiture relating to motor boats except for failure to observe the provisions of section six of this Act.

Sec. 9. That all laws and parts of laws only in so far as they are in conflict herewith are hereby repealed: Provided, That nothing in this Act shall be deemed to alter or amend acts of Congress embodying or revising international rules for preventing collisions at sea.

Sec. 10. That this Act shall take effect on and after thirty days after its approval.

PILOT RULES

For the Inland Waters of the Atlantic and Pacific Coasts, and on the Gulf of Mexico, Except Rivers Emptying Into the Gulf of Mexico and Their Tributaries

Rules and Regulations for the government of Pilots of Vessels propelled by steam, gas, fluid, naphtha, or electric motors, and of other vessels propelled by machinery, navigating the harbors, rivers, and inland waters of the United States, except the Great Lakes and their connecting and tributary waters as far east as Montreal, the Red River of the North, and rivers emptying into the Gulf of Mexico and their tributaries.

PRELIMINARY

In the following rules the words "steam vessel" and "steamer" shall include any vessel propelled by machinery.

A vessel is under way, within the meaning of these rules, when she is not at anchor, or made fast to the shore, or aground.

Risk of collision can, when circumstances permit, be ascertained by carefully watching the compass bearing of an approaching vessel. If the bearing does not appreciably change, such risk should be deemed to exist.

SIGNALS

The whistle signals provided in these rules shall be sounded on an efficient whistle or siren sounded by steam or by some substitute for steam.

A short blast of the whistle shall mean a blast of about one second's duration.

A prolonged blast of the whistle shall mean a blast of from four to six seconds' duration.

One short blast of the whistle signifies intention of or assent to steamer first giving the signal to direct course to own starboard, except when two steamers are approaching each other at right angles or obliquely, when it signifies intention of steamer which is to starboard of the other to hold course and speed.

Two short blasts of the whistle signify intention of or assent to steamer first giving the signal to direct course to own port, except when two steamers are approaching each other at right angles or obliquely, when the signal signifies desire of or assent to steamer which is to port of the other to cross the bow of steamer to starboard.

Three short blasts of the whistle mean, "My engines are going at full speed astern."

When vessels are in sight of one another a steam vessel under way whose engines are going at full speed astern shall indicate that fact by three short blasts on the whistle.

Rule 1. If, when steam vessels are approaching each other, either vessel fails to understand the course or intention of the other, from any cause, the vessel so in doubt shall immediately signify the same by giving several short and rapid blasts, not less than four, of the steam whistle, the danger signal.

Whenever the danger signal is given, the engines of both steamers shall be stopped and backed until

the headway of the steamers has been fully checked; nor shall the engines of either steamer be again started ahead until the steamers can safely pass each other, and the proper signals for passing have been given, answered, and understood.

Rule 2. Steam vessels are forbidden to use what has become technically known among pilots as "cross signals," that is, answering one whistle with two, and answering two whistles with one. In all cases, and under all circumstances, a pilot receiving either of the whistle signals provided in the rules, which for any reason he deems injudicious to comply with, instead of answering it with a cross signal, shall at once sound the danger signal and observe the rule applying thereto (Rule I).

Rule 3. The signals for passing, by the blowing of the whistle, shall be given and answered by pilots, in compliance with these rules, not only when meeting "head and head," or nearly so, but at all times, when the steam vessels are in sight of each other, when passing or meeting at a distance within half a mile of each other, and whether passing to the starboard or port.

The whistle signals provided in the rules for steam vessels meeting, passing, or overtaking, are never to be used except when steamers are in sight of each other, and the course and position of each other can be determined in the day time by sight of the vessel itself, or by night by seeing its signal lights. In fog, mist, falling snow, or heavy rain storms, when vessels cannot so see each other, fog signals only must be given.

SITUATIONS

Rule 4. When steam vessels are approaching each other head and head, that is, end on, or nearly so, it shall be the duty of each to pass on the port side of the other; and either vessel shall give, as a signal of her intention, one short and distinct blast of her whistle, which the other vessel shall answer promptly by a similar blast of her whistle, and thereupon such vessels shall pass on the port side of each other. But if the courses of such vessels are so far on the starboard of each other as not to be considered as meeting head and head, either vessel shall immediately give two short and distinct blasts of her whistle, which the other vessel shall answer promptly by two similar blasts of her whistle, and they shall pass on the starboard side of each other.

The foregoing only applies to cases where vessels are meeting end on or nearly end on, in such a manner as to involve risk of collision; in other words, to cases in which, by day, each vessel sees the masts of the other in a line, or nearly in a line, with her own, and by night to cases in which each vessel is in such a position as to see both the side lights of the other.

It does not apply by day to cases in which a vessel sees another ahead crossing her own course, or by night to cases where the red light of one vessel is opposed to the red light of the other, or where the green light of one vessel is opposed to the green light of the other, or where a red light without a green light or a green light without a red light, is seen ahead, or where both green and red lights are seen anywhere but ahead.

Rule 5. Whenever a steam vessel is nearing a short bend or curve in the channel, where, from the height of the banks or other cause, a steam vessel approaching from the opposite direction can not be seen for a distance of half a mile, such steam vessel, when she shall have arrived within half a mile of such curve or bend, shall give a signal by one long blast of the steam whistle, which signal shall be answered by a similar blast given by any approaching steam vessel that may be within hearing. Should such signal be so answered by a steam vessel upon the farther side of such bend, then the usual signals for meeting and passing shall immediately be given and answered; but, if the first alarm signal of such vessel be not answered, she is to consider the channel clear and govern herself accordingly.

When steam vessels are moved from their docks or berths and other boats are liable to pass from any direction toward them, they shall give the same signal as in the case of vessels meeting at a bend, but immediately after clearing the berths so as to be fully in sight they shall be governed by the steering and sailing rules.

Rule 6. When steam vessels are running in the same direction, and the vessel which is astern shall desire to pass on the right or starboard hand of the vessel ahead, she shall give one short blast of the steam whistle, as a signal of such desire, and if the vessel ahead answers with one blast, she shall put her helm to port; or if she shall desire to pass on the left or port side of the vessel ahead, she shall

give two short blasts of the steam whistle as a signal of such desire, and if the vessel ahead answers with two blasts, shall put her helm to starboard; or if the vessel ahead does not think it safe for the vessel astern to attempt to pass at that point, she shall immediately signify the same by giving several short and rapid blasts of the steam whistle, not less than four, and under no circumstances shall the vessel astern attempt to pass the vessel ahead until such time as they have reached a point where it can be safely done, when said vessel ahead shall signify her willingness by blowing the proper signals. The vessel ahead shall in no case attempt to cross the bow or crowd upon the course of the passing vessel.

Every vessel coming up with another vessel from any direction more than two points abaft her beam, that is, in such a position, with reference to the vessel which she is overtaking that at night she would be unable to see either of that vessel's side lights, shall be deemed to be an overtaking vessel; and no subsequent alteration of the bearing between the two vessels shall make the overtaking vessel a crossing vessel within the meaning of these rules, or relieve her of the duty of keeping clear of the overtaken vessel until she is finally past and clear.

As by day the overtaking vessel can not always know with certainty whether she is forward of or abaft this direction from the other vessel she should, if in doubt, assume that she is an overtaking vessel and keep out of the way.

Rule 8. When two steamers are approaching each other at right angles or obliquely so as to involve risk of collision, other than when one steamer is overtaking another, the steamer which has the other on her own port side shall hold her course and speed; and the steamer which has the other on her own starboard side shall keep out of the way of the other by directing her course to starboard so as to cross the stern of the other steamer, or, if necessary to do so, slacken her speed or stop or reverse. The steamer having the other on her own port bow shall blow one blast of her whistle as a signal of her intention to cross the bow of the other, holding her course and speed, which signal shall be promptly answered by the other steamer by one short blast of her whistle as a signal of her intention to direct her course to starboard so as to cross the stern of the other steamer or otherwise keep clear.

If from any cause whatever the conditions covered by this situation are such as to prevent immediate compliance with each other's signals, the misunderstanding or objection shall be at once made apparent by blowing the danger signal, and both steamers shall be stopped, and backed, if necessary, until signals for passing with safety are made and understood.

Rule 9. When two steamers are approaching each other at right angles or obliquely, other than when one steamer is overtaking another, so that the steamer having the other on her own starboard side may cross the bow of the other without involving risk of collision, the steamer having the other on her own starboard side may cross the bow of the other. If the steamers are within half a mile of each other the steamer having the other on her own starboard side shall give, as a signal of her intention to cross the bow of the other, two short and distinct blasts of her whistle, which, if assented to, the other steamer shall promptly answer by two similar blasts of her whistle, when the steamer having the other on her own starboard bow may cross the bow of the other, in which case the steamer having the other on her own port side shall keep out of the way of the other. If, however, the steamer having the other on her own port side deems it dangerous for the other steamer to cross her bow, she shall sound the danger signal, in which case both steamers shall be stopped, and backed, if necessary, until signals for passing with safety are made, answered, and understood.

Rule 10. When a steam vessel and a sailing vessel are proceeding in such directions as to involve risk of collision, the steam vessel shall keep out of the way of the sailing vessel.

Rule 11. Every steam vessel which is directed by these rules to keep out of the way of another vessel shall, if the circumstances of the case admit, avoid crossing ahead of the other.

Rule 12. In narrow channels, every steam vessel shall, when it is safe and practicable, keep to that side of the fairway or midchannel which lies on the starboard side of such vessel.

Rule 13. In obeying and construing these rules due regard shall be had to all dangers of navigation and collision, and to any special circumstances which may render a departure from the above rules necessary in order to avoid immediate danger.

SOUND SIGNALS FOR FOG, AND SO FORTH

Rule 14. In fog, mist, falling snow, or heavy rain storms, whether by day or night, signals shall be given as follows:

A steam vessel under way, except when towing other vessels or being towed, shall sound, at intervals of not more than one minute, on the whistle or siren, a prolonged blast.

A steam vessel when towing other vessels shall sound at intervals not more than one minute, on the whistle or siren, three blasts in succession, namely, one prolonged blast followed by two short blasts.

A vessel towed may give, at intervals of not more than one minute, on the fog horn, a signal of three blasts in succession, namely, one prolonged blast followed by two short blasts, and she shall not give any other.

A vessel when at anchor shall, at intervals of not more than one minute, ring the bell rapidly for about five seconds.

SPEED TO BE MODERATE IN FOG, AND SO FORTH

Rule 15. Every steam vessel shall, in a fog, mist, falling snow, or heavy rain storms, go at moderate speed, having careful regard to the existing circumstances and conditions.

A steam vessel hearing apparently forward of her beam, the fog signal of a vessel, the position of which is not ascertained, shall, so far as the circumstances of the case admit, stop her engines, and then navigate with caution until danger of collision is over.



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